

METABOLISM

Insulin's daily rhythm

The increased risk of type 2 diabetes and obesity seen in people who keep unusual hours may be tied to daily, or circadian, rhythms relating to the blood-glucose-regulating hormone insulin.

Carl Hirschie Johnson and his group at Vanderbilt University in Nashville, Tennessee, showed that mice are less responsive to insulin during the day — when they rest. The researchers disrupted the day–night cycles of mice by exposing them to continuous light or by knocking out a gene that is associated with the circadian clock. When fed a high-fat diet, the disrupted mice became fatter than non-disrupted animals.

The authors suggest that the human internal clock could be targeted to modify metabolic diseases.

Curr. Biol. <http://dx.doi.org/10.1016/j.cub.2013.01.048> (2013)

MEDICINE

Stem cells guide Alzheimer's drugs

Neural cells grown from stem cells of patients with Alzheimer's disease could be used to evaluate drugs for subsets of patients.

Teams led by Haruhisa Inoue of Kyoto University, and Nobuhisa Iwata of Nagasaki University, both in Japan, generated induced pluripotent stem (iPS) cells from patients with inherited and non-inherited forms of the disease. Neurons derived from these cells were treated with the omega-3 fatty acid docosahexaenoic acid — which has previously failed in some clinical trials for Alzheimer's



NANOMATERIALS

Solid carbon, springy and light

Two projects have produced elastic, ultra-light carbon foams without using a template.

Chao Gao and his colleagues at Zhejiang University in Hangzhou, China, freeze-dried solutions of carbon nanotubes and large sheets of graphene oxide, and then chemically removed oxygen to leave a conductive, elastic, solid foam (pictured with long-stemmed grass) with a density lower than that of air. These aerogels can absorb up to 900 times their own weight in oil — better than commercial absorbents.

Zongbin Zhao and Jieshan Qiu, at Dalian University of Technology in China and their

colleagues have made similar, but slightly heavier aerogels, from graphene oxide sheets. Their aerogel is extremely elastic, bouncing back when compressed, so may be useful in absorbing energy and dampening vibrations for a variety of machinery. Although similarly light carbon aerogels have been made before, they have relied on template scaffolds that were later etched away, a technique that limits the size of the final structure.

Adv. Mater. <http://dx.doi.org/10.1002/adma.201204576>; <http://dx.doi.org/10.1002/adma.201204530> (2013)

disease. The compound partially increased the survival time of neurons from a patient with an inherited form of the disease but had no effect on the survival of neurons from patients with non-inherited disease. Responses to cellular stress as well as accumulation of the protein amyloid- β , which is associated with the disease, also varied between neurons derived from different patients.

The authors suggest that patient-specific iPS cells could help researchers to explain

variable clinical results and guide drug development.

Cell Stem Cell <http://dx.doi.org/10.1016/j.stem.2013.01.009> (2013)

BIOGEOCHEMISTRY

Carbon cycles Down Under

Despite emissions from wildfires, changes in land use and extreme variability in carbon uptake from the biosphere, Australian

ecosystems absorbed enough carbon to offset nearly a third of its fossil-fuel emissions between 1990 and 2011.

Vanessa Haverd of the Commonwealth Scientific and Industrial Research Organisation in Canberra and her colleagues combined a regional biogeochemical model with emissions data extracted from databases and the literature to produce a comprehensive carbon budget. Contributing to the offset, rising carbon dioxide